

1 UNITED STATES  
2 NUCLEAR REGULATORY COMMISSION

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6 PUBLIC MEETING  
7 PACKAGE PERFORMANCE STUDY AND NUREG/CR-6672  
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13 Wednesday, August 16, 2000  
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16 Conference Room  
17 Mountain View Casino & Bowl  
18 1750 Pahrump Valley Road  
19 Pahrump, Nevada  
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22 The above-entitled meeting commenced, pursuant to  
23 notice, at 7:00 p.m.  
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1 P R O C E E D I N G S

2 [7:00 p.m.]

3 MR. CAMERON: Good evening, everybody, and welcome  
4 to the NRC's public meeting on spent fuel transportation.

5 My name is Chip Cameron. I'm the Special Counsel  
6 for Public Liaison at the Nuclear Regulatory Commission, and  
7 I'm going to serve as your moderator for tonight's meeting.

8 In a few minutes, Dr. Susan Shankman, from the  
9 NRC, who is up at the table, is going to give you a formal  
10 welcome and also talk a little bit about what the NRC's  
11 responsibilities are in regard to spent fuel transportation.

12 What I'd like to do is just cover three things  
13 real briefly with you before we go to the substance of  
14 tonight's program. One thing is objectives of the meeting.  
15 The second thing is ground rules for the meeting. The third  
16 item is to just go over the agenda very briefly with you  
17 tonight.

18 I just want to emphasize, we have some important  
19 information for you tonight, but we're going to keep our  
20 presentations brief so that you can spend most of the time  
21 tonight in discussion with all of you.

22 In terms of objectives for the meeting, we want to  
23 inform you of the NRC's responsibility for the  
24 transportation of spent fuel. We also want to tell you  
25 about a study that the NRC did on spent fuel transportation

1 risk and also talk a little bit about a new study that we  
2 have initiated that is going to take a look at spent fuel  
3 packages and what happens under accident conditions.

4 We'll be talking about all those issues tonight.  
5 We also want to answer any of your questions that you might  
6 have and hear any comments that you might have on the NRC's  
7 spent fuel transportation risk program.

8 IN terms of ground rules for the meeting, when we  
9 do get into the discussion period, if you have a question or  
10 a comment, just signal me, and I think I'll be able to bring  
11 this microphone out to you or you can come up to the  
12 standing mic.

13 Please state your name and affiliation, if  
14 appropriate, because we are keeping a transcript over here  
15 and, of course, that transcript will be available. Carey is  
16 our stenographer tonight. And state your question or your  
17 comment and we'll try to give you some information on that.

18 I would just ask you to try to be to the point,  
19 but since we don't have a big crowd tonight, I think we'll  
20 have plenty of time for people to talk. But I do want to  
21 make sure that everybody has an opportunity to talk and also  
22 that we give your attention to whomever has the floor at the  
23 time, and that will also help us keep a clean transcript if  
24 only one person at a time is talking.

25 In terms of the agenda, we're going to start off

1 with Dr. Shankman, who is going to briefly talk about NRC  
2 responsibilities in the area of spent fuel transportation.  
3 We're then going to go to Mr. Robert Luna, who is right  
4 here, and Bob is a consultant for Sandia Labs, who contracts  
5 on spent fuel transportation risk studies.

6 He is going to talk about the spent fuel risk  
7 transportation study that was completed in March.

8 Right after that, we're going to Rob Lewis, from  
9 the NRC staff, to talk about a new study which is going to  
10 look at the performance of spent fuel packages.

11 We'll try to do this fairly efficiently, so then  
12 we can go out to you for discussion.

13 I would thank all of you for being with us tonight  
14 and I hope this is informative for you. I know there's a  
15 lot of other issues of concern here in Nye County in terms  
16 of the high level waste program.

17 We really want to focus on transportation tonight,  
18 but we're always glad to listen to your concerns and  
19 questions about other issues and if we can provide you with  
20 information on those other issues, we'll do that, but we do  
21 want to really get the information out to you on  
22 transportation.

23 And with that, what I'd like to do is to introduce  
24 Dr. Susan Shankman. Susan is the Deputy Director of the  
25 Spent Fuel Project Office at the NRC. It's a dedicated

1 office with a mission to all issues related to spent fuel.  
2 She has been with the NRC since 1982, so approximately 20  
3 years.

4 In her career with the NRC, she has been involved  
5 with the materials licensing program, but also with the  
6 reactor program. So she has a pretty good overview with  
7 what the Commission does and activities that affect spent  
8 fuel transportation.

9 She has a doctorate from the University of  
10 Southern California, but she never goes far from her New  
11 York City roots. Right?

12 MS. SHANKMAN: Right.

13 MR. CAMERON: Susan Shankman.

14 MS. SHANKMAN: Good evening. I'm glad to be here,  
15 and I will be brief. As Chip says, we're going to be brief,  
16 in his instructions to us in the introduction.

17 I am with the Spent Fuel Project Office. So just  
18 to tell you that the Spent Fuel Project Office is part of  
19 the U.S. Nuclear Regulatory Commission and our office is  
20 particularly concerned with storage of spent fuel and  
21 interim storage as opposed to repository storage, and our  
22 office is also concerned with transport of spent fuel and  
23 other radioactive material. So that's the part of the  
24 Commission that I'm with.

25 And just to -- some of you may already know this,

1 but just to reiterate that the U.S. Nuclear Regulatory  
2 Commission is an independent Federal regulatory agency and  
3 in this sense, independent means that we make our decisions  
4 on scientific and technical merit, and that is the basis of  
5 what we do.

6 The mission of the Commission is simply to protect  
7 public health and safety in the use of radioactive material  
8 that is licensed by the Commission.

9 As Chip said, we deal with reactors, with medical  
10 uses, with commercial uses, like watch dials and smoke  
11 detectors and other places where radioactive material is  
12 found. We regulate that use.

13 How do we do that? It's easy to think of it just  
14 this way. We set standards that are then, if someone meets  
15 our standards for the use of radioactive material, whether  
16 it's use, possession, transport, then we issue approvals to  
17 do that, licenses, certificates.

18 Then we set against those standards those people  
19 who have a license or a certificate from us and then we look  
20 if they are meeting those standards. If they are not  
21 meeting the standards, then we enforce compliance with those  
22 standards and we have stopped people from shipping, we have  
23 stopped people from operating radio pharmacies, we have  
24 stopped people from administering diagnostic tests that  
25 they're doing, and we have shut down nuclear power plants.

1           So that is how we enforce compliance, until they  
2 come into compliance.

3           And to do all this, we need a certain base of  
4 information, technical information, scientific assessments,  
5 and what we're talking about tonight is part of that  
6 program. I'm going to talk about a study just completed in  
7 which we looked at routine transportation and accidents in  
8 transport of radioactive spent fuel. We only looked at that  
9 small portion.

10          There are -- in fact, the old estimate is about  
11 three million radioactive shipments a year in this country.  
12 We're doing a little assessment and so far we've come up  
13 with nine million and we're still looking at it.

14          So radioactive material is shipped all the time in  
15 this country and most of it, of course, is not spent fuel.  
16 That's a very small portion of the radioactive material that  
17 is shipped. Most of it is medical and commercial.

18          So the research that we're talking about in terms  
19 of the future has to do with looking at package performance,  
20 packages in which spent fuel is shipped. Package  
21 performance in severe accidents, and Rob Lewis will tell you  
22 how we're planning to do that and why do we need your help.

23          Just a brief slide. You may all know this, but  
24 I'd like to remind people that transportation of spent fuel  
25 is not a one-agency activity; that high level waste and

1 spent fuel, there has to be a shipper, which is somebody  
2 licensed to ship it, and that's usually a nuclear utility,  
3 or it could be the Department of Energy.

4          Then there's the carrier, whether it's a railroad  
5 or a truck company. Then there is the regulators who set  
6 the standards for the transport, and, again, that's NRC,  
7 U.S. Department of Transportation, and the states. The  
8 states, including Nevada, have a very big role in transport  
9 and we can talk about that if anybody has any questions.

10          Then there are emergency responders, and those are  
11 local people who have been trained from the U.S. Department  
12 of Transportation, and tribal responders, also. And HAZMAT  
13 teams, you may be familiar with them, as well as Federal  
14 assistance which is available to train people.

15          There are also advance notifications of governors.  
16 And we have a rulemaking out right now to see how to notify  
17 proper authorities. So that's not part of our regulations  
18 right now. However, as a courtesy, we have done that.

19          So what, as a manager, what am I hoping that we  
20 get out of today? What I'm hoping we get out of today is a  
21 little information going out from us and a lot of comments  
22 coming back from you all.

23          The information that we have will be on the  
24 studies that we've done and, as Chip said, Bob Luna is going  
25 to talk about a publication that we developed, that we hope

1 to developing into a more plain English, not bureaucratic,  
2 acronym document. So we'll talk about that document and  
3 what we can do to make it more of a public brochure rather  
4 than a scientific paper.

5 The other thing is we'll talk the study that I  
6 talked about, on which we want comments from you all on what  
7 we should be doing, and continue the dialogue on transport.

8 It's an ambitious project that we're embarking on  
9 and we need to spend our dollars wisely, so we need your  
10 help.

11 Thank you.

12 MR. CAMERON: Okay. Great. Thanks, Susan. And  
13 Susan, of course, is going to be here and ready to answer  
14 any questions or listen to comments that you have when we  
15 get done with the presentations.

16 This is going to be -- the next presentation is  
17 going to be on spent fuel transportation risk and the study  
18 the NRC recently had completed by Sandia Labs.

19 Bob Luna is going to do this presentation. He's a  
20 consultant to Sandia National Labs, who the NRC has used to  
21 develop the central transportation risk studies.

22 He has a Ph.D. from Princeton University and he's  
23 a mechanical engineer by training. He has been involved for  
24 16 years alone in the transportation risk field with Sandia  
25 Labs. He is retired now, I believe, from them, or he is a

1 consultant to Sandia. He's also on the editorial board of  
2 the International Journal of Radioactive Material  
3 Transportation.

4 Bob, I would just turn this over to you. The  
5 handouts for this presentation are right over there, if  
6 anybody needs one.

7 MR. LUNA: This is my first trip to Pahrump and so  
8 I'm pleased to be here and pleased to see the new faces. I  
9 see a lot of faces that we saw earlier in the week in Las  
10 Vegas.

11 The paper I'm going to give you tonight or talk to  
12 you about tonight is a condensation, the talk I'm going to  
13 give you is a condensation of a paper and the paper that I'm  
14 going to talk about is this one, which was in the packet  
15 that was sent out by the NRC earlier. It has about 20 pages  
16 in it.

17 This paper is based upon this document, which is  
18 called the reexamination of spent fuel risk estimates. And  
19 so you see I'm condensing this into this and then I'm  
20 condensing this into this talk, to keep it at a reasonable  
21 pace.

22 So what's this about? The idea that I want to  
23 talk to you about tonight really has two parts. The first  
24 thing is I want to solicit input from you with regard to the  
25 content of this paper. I want to know whether or not you

1 think it's readable, whether it's useful, whether it tells  
2 you something you want to know.

3 The other thing I'm going to talk to you about is  
4 I'm going to give you a very brief introduction or a very  
5 brief description of what's in this report, highly  
6 condensed, so that you have an idea of the work that has  
7 transpired.

8 Again, this is the cover of the report we're  
9 looking at.

10 Now, the title of the large report is "A  
11 Reexamination of Spent Fuel Risk Estimates." So the  
12 question you should ask yourself or perhaps I ask myself is  
13 why should we reexamine these risks.

14 Well, the reason for the reexamination really had  
15 about five parts and they're up here on the slide.  
16 Obviously, there is significant public concern about the  
17 shipment of spent fuel and the safety of those shipments.

18 Two, NRC has oversight of the spent fuel safety  
19 and those issues, and so they have a reason to want to  
20 understand what the current state of risk is with regard to  
21 shipments.

22 Three, most people expect that there will be an  
23 increase in spent fuel shipments over the next few decades  
24 to meet the repository program in the United States,  
25 although it's certainly not clear exactly how that's going

1 to be prosecuted and when.

2 And, four, the spent fuel characteristics that  
3 have been looked at in previous reports and evaluations of  
4 risk are really likely to be a little different in the next  
5 few decades. The fuel is likely to be a bit older and have  
6 some different radiation characteristics, which implies that  
7 the casks in which they are going to be shipped are likely  
8 to be a little different to optimize the number of  
9 shipments.

10 The sixth reason is basically that a reexamination  
11 was in order because we are better able to look at the  
12 techniques, the response of casks, using more modern tools.  
13 High speed computers have increased the capability to look  
14 at details and structure a thermal analysis and, in  
15 addition, there's some better understanding of some of the  
16 internal processes.

17 Now, I'm going to give you some results from the report, but  
18 the principal authors of the report are sitting here in the  
19 room and if you have a question that I can't handle, which  
20 is likely to be almost any question, these guys, Doug  
21 Ammerman, Jerry Sprung, and Joe Kotsi are available to talk  
22 in detail.

23 Let's talk a little bit about the history here.  
24 On this slide, you see four reports. The first report, over  
25 here on my side, is the final environmental statement on the

1 transport of radioactive materials by air and other motives.

2 This was published in 1977 by the NRC and looked  
3 at about two dozen kinds of radioactive material shipments,  
4 spent fuel being one of those. It made some estimates about  
5 what the risk was of shipping spent fuel during that period.

6 The second report is the transportation of  
7 radioactive in urban environments, which was a subset of  
8 this study to look at shipping through very high population  
9 density areas, and you should be thinking New York in that  
10 case.

11 The third study is what is usually referred to as  
12 the modal study, which was a reevaluation of the accident  
13 risk of shipping spent fuel. That was done in 1987. The  
14 goal there was to apply modern tools, at that time, to look  
15 at the response of casks to the kind of events that might  
16 happen in transportation accidents.

17 That study showed that the risk estimated in 1977  
18 for accidents was probably about one-third high; that is to  
19 say, this report thought that the actual risk was about  
20 one-third less than what was shown there.

21 And the last document there is the one we're  
22 talking about here, the current document, and down at the  
23 bottom here is what the word "future" means and is what Rob  
24 Lewis wants to talk to you about tonight, as well; that is,  
25 the package performance study, which is the next iteration

1 of the kind of analysis that was done in the modal study.

2 Now, in the way of review, and I'm sure that you  
3 all know this, spent fuel, this is a boiling water reactor  
4 fuel element. The basic content of the fuel element is fuel  
5 pellets, which are uranium oxide. They are stacked in a  
6 cladding, a zircalloy cladding, to make up the fuel pins,  
7 and the fuel pins or fuel rods go into and make up a fuel  
8 assembly which goes into the reactor and participates in  
9 producing power, producing steam to produce power.

10 When the uranium fuel value is spent, the fuel is  
11 said to be spent, it's put in the spent fuel pool and it's  
12 held until it cools or until it can be shipped either into a  
13 storage facility or into a final repository.

14 The fuel is shipped in casks which look something  
15 like this one that's up on the screen. The basic features  
16 of the cask are that they are very heavily shielded in order  
17 to maintain -- keep the radiation to a reasonable and  
18 regulated level external to the cask.

19 It has a lid to put the material in, which is  
20 bolted and held in place and sealed, and the basic function  
21 of this cask is to make sure that the shielding stays intact  
22 and the containment of the spent fuel stays intact through  
23 all kinds of conditions that occur in transportation, up to  
24 and including severe accidents.

25 Now, what was done in the risk study and is

1 contained in the documents we've talked about is a risk  
2 assessment. And when we talk about risk assessment, we're  
3 talking about answering three questions; what can happen to  
4 this cask when it's in transit, how likely is that event to  
5 occur, and how serious are its consequences.

6 And we apply those three questions to the accident  
7 risk and we also apply it to non-accident risk, because  
8 there are risks during shipments that occur completely  
9 incident-free as a result of this external radiation field  
10 that surrounds casks that I talked about earlier.

11 In the non-accident case, when we ask the question  
12 what can happen, well, what can happen does happen. There  
13 is a low level radiation field around the cask and it's  
14 limited to ten millirems per hour, and I'm sure everybody  
15 understands what a millirem is, and that could be your next  
16 question after I get finished, limited to ten millirems at  
17 6.6 feet; that is to say, two meters from the cask.

18 Now, ten millirems per hour is a dose which is --  
19 you accumulate in -- well, natural background dose here is  
20 about 300 millirems per year and this is ten millirems per  
21 hour. So it's a very small fraction of the annual dose and  
22 if you stood next to this cask for an hour, you'd get like  
23 1/30th of the annual dose, annual background dose in this  
24 area.

25 The next question we ask is how likely is this

1 radiation field to happen. Well, this radiation field  
2 occurs all the time and if there is someone near the cask,  
3 then that person will receive a radiation dose.

4 And what we do is, we're down to -- we look at all  
5 of the situations in which people might be exposed to the  
6 radiation and we look at what its consequences are, and the  
7 consequences of radiation exposures come in units and  
8 they're called units of person rem; that is, we sum up the  
9 total number of people exposed and the total dose that each  
10 person receives and that is a measure of the risk from  
11 radioactive material from spent fuel shipping.

12 Now, in the accident risk case, the process is a  
13 little more interesting. When we ask the question what can  
14 happen, we rely on things like event trees and event trees  
15 show a sequence of events that might involve a cask and get  
16 you to a place where a cask might be compromised as a result  
17 of an impact or a fire or something like that.

18 So the impacts -- the event tree gets you to an  
19 understanding of the scenario or what might happen. It  
20 takes you to the place where the experts, like Jerry and  
21 Doug and Joe, calculate cask response as a result of big  
22 impact, high speed impacts or huge fires, and they look at  
23 whether or not a cask might fail and to contain the material  
24 -- that is, the seals might fail or something like that --  
25 they look at how much might get out.



1 They also look at how likely that event is and the  
2 likelihood of that event also comes off the event tree and  
3 allows you to put a probability of an event on the event  
4 itself.

5 And then when we look at how serious are its  
6 consequences, we do it the same way we did before. We look  
7 at the total number of people who are exposed and we sum up  
8 all of the doses that they received.

9 But in the accident case, what we do is we look at  
10 all the accidents that might occur and we weight those  
11 person rem by the probability of the event.

12 So if an event is very, very, very unusual, then  
13 the dose that comes from that event is a very small number.

14 So having described the basic process on how you  
15 do risk assessment, these are the results that come out of  
16 this document. And the results are in the accident risk  
17 case, it shows the comparison of the dose that was -- the  
18 risk that was estimated in this study, which is the  
19 right-most column on each graph, and the risk that was  
20 estimated in 1977, in the first document that I showed you.

21 As you can see in this diagram, the risks are --  
22 you'll have to take my word for it, at least briefly -- that  
23 the risks, both of these risks are, in fact, quite small.  
24 And in addition, the improved capability to estimate risk  
25 that we have now suggests that the risks that were estimated

1 in 1977 really overstated the risk to the population.

2 The risk estimates here are really quite a bit  
3 smaller for this for both truck and rail.

4 And this is the results for the non-accident case  
5 or the incident-free transport. Again, the doses and the  
6 dose risks that are estimated in the more modern study are  
7 lower than those that were estimated in the 1977 study, but  
8 the difference is not quite so dramatic.

9 So the next question is -- the summary of the risk  
10 situation is the first shipment risk, both incident-free and  
11 accident risk, are lower than 1977 estimates. And I see the  
12 people from Sandia looking at the slide and wondering what  
13 regulations IONS are.

14 The yearly dose for typical shipments in the next  
15 few decades is quite a bit below 1977 estimates and the 1977  
16 estimates were found by the NRC, and I'll quote this and  
17 it's in your handout, that "present regulations are adequate  
18 to protect the public against unreasonable risk from the  
19 transport of radioactive materials" and that regulatory  
20 policy concerning transportation of radioactive materials be  
21 subject to close and continuing review.

22 That was what the NRC said in 1977. These  
23 reports, the reexamination report, the package performance  
24 study that Rob is going to talk about, are all part of that  
25 continuing activity by NRC to look at the risk from

1 shipments.

2 And this is the last slide. Basically, I've told  
3 you what's in this report. I would urge you to look at it.  
4 I would urge you to look at this report, which has some of  
5 the results in it, greatly condensed.

6 And what we'd like to have -- and what I'd like to  
7 have, as an author of this discussion draft, is your views  
8 about the level of detail in the report, its  
9 understandability, the points of concern, any points of  
10 concern about its content that you might have, and the  
11 overall tone of the presentation in the report. You can  
12 also comment on the overall tone of my presentation, if you  
13 want.

14 That basically is what I wanted to talk to you  
15 about. Again, I would like your input about whether we have  
16 gotten enough information in this report and whether or not  
17 we've done it correctly.

18 Chip?

19 MR. CAMERON: Thank you very much. I know people  
20 are going to have a lot of questions for Bob about the  
21 presentation that he just did. Some of you may not have had  
22 much of a chance to look over the report in terms of giving  
23 us comments on understandability and level of detail, but we  
24 hope that we can at least get some idea of that from you  
25 tonight.

1 We have one more very brief presentation to give  
2 you the total picture here and then we want to turn it over  
3 to you for discussion.

4 Our next presenter is Rob Lewis, from the NRC  
5 staff, and Rob is going to talk about the new study that's  
6 been initiated, what's called the package performance study.

7 Rob is a nuclear engineer and he works in the  
8 NRC's Spent Fuel Project Office. He's been with the NRC for  
9 approximately eight years. He got a graduate degree, a  
10 Master's Degree in Nuclear Engineering from the University  
11 of Arizona, and he has an undergraduate degree in physics.

12 One of his chief responsibilities at the NRC now  
13 is he is the project manager for the study he is going to  
14 talk to you about, and he's been the project manager for  
15 this study since its inception.

16 Rob?

17 MR. LEWIS: Thanks. I will talk a little bit  
18 about the package performance study. We're having the  
19 meeting tonight, the timing of tonight's meeting really has  
20 to do with the package performance study, because we're at  
21 an important decision point for the package performance  
22 study. We're at the end of what we call the scoping phase.

23 That is designed to try to define what we'll be  
24 doing for the next couple of years.

25 We've done several studies and this one is coming

1 out. There are four main studies that NRC has done, '77, in  
2 1987 we did the modal study. We just published the  
3 reexamination study, which Bob just talked about. And the  
4 package performance study is the next and it will be  
5 completed in three to four years.

6 One thing I would like to point out here is that  
7 the package performance, in 1987, we updated the severe  
8 accident part of the 1977 project, and the package  
9 performance study can be thought of the same way. We're  
10 updating the severe accident part of the year 2000 project.

11 So what is this package performance study? Well,  
12 it's a study of spent fuel transportation accidents, both  
13 truck and rail. As I mentioned, we want to build upon what  
14 we just finished in the year 2000 reexamination study.

15 We'll only be looking at severe accidents in this  
16 study and the way this study is different than past studies  
17 is that this study will try to incorporate some means of  
18 testing casks.

19 We would like to do a test where -- in the 2000  
20 reexamination study that was done, they looked at all kinds  
21 of accidents, many, many different kinds of fires and  
22 collisions that casks could be involved in.

23 And in the package performance study, we'd like to  
24 do a test to make sure that the way we looked at those many  
25 types of accidents was appropriate. We want to make sure we

1 have a good level of confidence in the way the year 2000 was  
2 conducted.

3 Another major thing we're looking at, and there  
4 isn't a bullet to talk on this point, but I wanted to make  
5 it as a -- we want to update the accident data and the  
6 accident sequences data that we have. The modal study, that  
7 was from the early '80s and it's been 20 years since then,  
8 so it just makes good sense to take a good look at that and  
9 see if that's still valid information.

10 And we are using the public participation approach  
11 to try to design the package performance study. As we step  
12 through the package performance study milestones, we want to  
13 reach out to the public and make sure that everybody  
14 understands what we're doing and that we're doing the best  
15 things, in people's minds.

16 I have a full slide on public participation in a  
17 moment.

18 So why are we here today? Like I said, we just  
19 finished a major milestone. We finished the scoping study,  
20 which is on the table and probably has also been mailed to  
21 several of you. It's attachment one to this letter that's  
22 on the table.

23 And what that scoping study -- many of you  
24 remember, last year, we had several meetings to collect  
25 views on what we should be doing in the package performance

1 study. And what this scoping study does, this issues and  
2 resolution report actually is the name of the document.

3 What that does is it took the collection of the  
4 views that we heard and what we think we can do to help  
5 respond to those views in the study.

6 And we're here tonight to collect feedback on how  
7 well that study reflected the views that we heard the last  
8 year. We're also here to find out if the options we present  
9 in that study would help respond to those concerns that were  
10 raised last year.

11 We also want to make sure that if anybody has any  
12 new concerns that aren't reflected in this report, that you  
13 let us know those.

14 Now, we don't expect everyone, of course, to give  
15 us all their comments on that report, it's 50-something  
16 pages. We won't expect everybody to give all their comments  
17 tonight, but we are collecting written comments. If you  
18 have written comments, you can give them to us. The address  
19 for my address and the Sandia people's address is on page  
20 three of the report.

21 I skipped something. I want to introduce the  
22 authors of the report, the issues and issue resolution  
23 items, that are here tonight to answer any questions you  
24 might have. Jerry Sprung from Sandia, Doug Ammerman from  
25 Sandia, and Joe Kotsi from Sandia.

1 Doug is the structural reviewer, the collisions  
2 person. Joe is the person that did the fire comments, and  
3 Jerry did the balance. Their manager is also here tonight,  
4 Ken Sorenson, from Sandia.

5 As I mentioned, public involvement is a very  
6 important part of this project and this is just one step in  
7 our public involvement process. I'm sure we'll be out again  
8 as we proceed with this study.

9 We have established a web site. You can go to the  
10 web site, ask questions, maybe look at the frequently asked  
11 questions to see if your question has already been asked,  
12 and the interactive -- and all the documents that we -- we  
13 put all the reports that we write on the web site. We don't  
14 hold back anything. We'd rather have it on there than not.

15 And workshops, as I mentioned, we were hear last  
16 year, we're here again tonight as a follow-up to that. We  
17 were in Las Vegas last night and next month we'll be holding  
18 another workshop in the Washington, D.C. area, for the  
19 Washington, D.C. people that are working on these types of  
20 issues.

21 And we have a mailing list. If you received this  
22 from us in the mail, then you're already on our mailing  
23 list. If you didn't and want to be on the mailing list,  
24 please leave your name and address with Jim. We mail  
25 something once a year, so don't expect to start receiving a

1 newsletter every week or something. But if you want to keep  
2 in touch with the project in a way other than the web site,  
3 we'll make sure that you have this opportunity.

4 And that's all I have for now. We will be happy  
5 to try to respond to any comments that people have.

6 MR. CAMERON: Good. This will make things easier  
7 for us, I think. I just wanted to say that we do have a lot  
8 of resources in the room, not only the people you heard from  
9 from NRC and Sandia, but also other NRC staff. We also have  
10 representatives here from the Department of Energy and  
11 Department of Transportation.

12 So if you have questions, let's try to give you as  
13 much information as possible.

14 There is one person on the NRC staff that I would  
15 like to introduce because he is -- he's our local site  
16 representative, Bob Hadder. Bob, can you stand up? And we  
17 have three on-site representatives in Nevada now. They are  
18 stationed here in Las Vegas. And if you want to talk to Bob  
19 and get his number, please do that after the meeting. But I  
20 just wanted to make sure you everybody knew Bob.

21 Rob, just one more point. As Rob stated in our  
22 September 13 meeting, we're going to have people from the  
23 government agencies around the table. I just wanted to note  
24 that it will be government agencies, but also people from  
25 industry and also people from citizen groups who have

1 concern about this in the Washington area.

2 On that note, I would just say that we do have  
3 some representatives from Citizen Alert in Nevada, a  
4 citizens group with us tonight who will be -- I'm sure we'll  
5 be hearing from tonight.

6 But they do have some of their material over there  
7 on the table, if anybody would like, including their summer  
8 2000 newsletter.

9 So with that, let me go out to you for questions.  
10 I'm not exactly sure what we're going to be doing with this  
11 microphone, but we'll keep trying to use it. See, we need a  
12 mic to go into the transcription, but this is going to  
13 really be -- I don't think that this cord is going to be  
14 long enough to get to everybody.

15 MR. BURSTON: Hi. I'm Bill Burston. I want to  
16 ask how many actual physical tests have you done on the  
17 worst accident cases and what was the results? Did the  
18 thing break open?

19 MR. CAMERON: Who wants to take that one?

20 MR. SORENSON: That's Rob's part of his talk on  
21 the performance study. The intent is to propose doing some  
22 actual tests so that we can verify the analyses we did on  
23 the reexamination to confirm the actual performance and  
24 response of that cask in these severe accidents.

25 It's part of the ongoing evaluation of the

1 performance of the casks, but not part of this program here.  
2 We want to test them for Department of Energy and other  
3 Federal organizations, but not as a part of this program  
4 here.

5 MR. CAMERON: Let's go to -- Susan, can you pass  
6 that mic to Less Bradshaw, please?

7 MR. BRADSHAW: At this late date in this program,  
8 20-some years into it, as you can see, the folks in Nye  
9 County say full scale cask testing hasn't been done.

10 You can do all the computer modeling that you  
11 want, the average person out in the public doesn't care.  
12 They don't trust it, they don't understand it, and they  
13 don't accept it.

14 We urge you to bring full scale cask testing to  
15 Nye County as part of the overall exercise, burn it, crush  
16 it, bump it, break it, and then let people touch it and feel  
17 it and measure it.

18 And you can still do that in the context to verify  
19 the modeling. The cost of full scale cask testing fails to  
20 insignificance in the context of total system cost, which is  
21 multi-billion dollars. You've probably spent more on  
22 Bachelors doing nuclear modeling than you would have done if  
23 you had building it and bringing it out, some generic test  
24 in Nye County or somewhere, burning it at X degrees as far  
25 as so many hours.

1 I don't know what's right or wrong. The public  
2 doesn't believe anybody, because it's all modeled. Nye  
3 County asks the NRC, the DOT, the DOE, why there has to be  
4 any additional risk to anybody in Nye County or anyone in  
5 the country from the results of a severe accident.

6 We urge that course of action. You folks need to  
7 realize you are beating on a long dead horse here. You are  
8 only doing what the law tells you to do. There are issues  
9 with Congress on this issue, we understand that. But we  
10 have to urge the zero risk proposition on transportation of  
11 nuclear materials.

12 MR. CAMERON: Thanks a lot, Les, for those  
13 comments. That's exactly the type of feedback I think the  
14 NRC needs, and also for putting the cost issue in  
15 perspective, the cost of cask testing. I guess I would ask  
16 Susan about the -- do we have any preliminary things to say  
17 about the tanker accident that we heard so much about?

18 MS. SHANKMAN: I want to say something first  
19 before that. We had the people at Sandia analyze what we  
20 knew about the accident and, of course, we would have to  
21 know more specifically.

22 But I think you're exactly right to not trust  
23 computer models. It seems to me a reasonable proposition  
24 for someone in the position you're in and I think that in  
25 order to do these tests, if we do them, they have to be done

1 in facilities that have the appropriate instrumentation and  
2 all of that.

3 That's not to say that someone couldn't witness  
4 it, a representative or someone, that organizations couldn't  
5 witness it and we couldn't then share some kind of  
6 information, pictures, and maybe physically bring some of it  
7 back here at some point, but the actual testing couldn't be  
8 done here because of the instrumentation needed and all of  
9 that.

10 But I don't think that it would be unreasonable to  
11 have somebody come and witness it who could bring back the  
12 information. That might be a way to do it without actually  
13 -- you understand the difficulty in bringing it here and  
14 testing it here, but that doesn't mean that your eyes can't  
15 be there.

16 And I think that that would -- you know, we can  
17 talk about a process to select the people who would come and  
18 who they would represent and how that would be done, and we  
19 would select all the representative group of people.

20 I'm not exactly sure how to do that, but you have  
21 citizens advisory groups and different groups, and so I  
22 think we could confer on that and see how that works out.

23 But I'm open to something like that and I think  
24 the staff would be open to something like that. We could  
25 work out the details.

1 And I think if people touch and feel it, I can  
2 readily understand how you would want to do that. I have a  
3 six-year-old granddaughter, and she doesn't believe anything  
4 I tell her. So she wants to see it and touch it and feel  
5 it, and I think that's a reasonable thing.

6 It would be a matter of how to make that happen in  
7 a way that is both feasible and satisfactory to the people  
8 who are involved, and that's something that we would have to  
9 think about and I'd like you to think about it and come up  
10 with some ideas for us.

11 Now, in terms of the specifics of the accident, do  
12 you want to talk about that?

13 MR. SORENSON: Joe.

14 MR. KOTSI: What we did is we took the pictures  
15 that we were able to get off the net and we looked at the  
16 trailers and it seemed that they had -- the trailer-truck  
17 had crashed and the two trailers were burning separately.  
18 These were gasoline tankers, so it was a pretty spectacular  
19 fire.

20 What we did in our simulation is we took a cask  
21 model that we already had in our computer, we put it right  
22 in between those two fires and we let it go for 90 minutes,  
23 and monitored it and we calculated the temperature increase  
24 in the area of the seals, which is one of the things, first  
25 things you worry about on these casks.

1 Over that period of time, actually, the peak  
2 occurred after the fire went out. The fire went out after  
3 about 90 minutes. At about two hours, the temperatures at  
4 the seal area picked up 20 degrees Fahrenheit, which would  
5 be like 40 degrees F roughly above what the normal seal  
6 temperature would be.

7 This is within the normal surges in the operating  
8 of these seals anyway. Our first calculation, this was not  
9 anything to worry about. I did not see Filger's study, so I  
10 don't know what he has seen in his numbers, but our first  
11 cut on it is that we couldn't get there, we couldn't make it  
12 a bad accident.

13 We can move things around and go through other  
14 scenarios, but I don't think we're going to get too much  
15 worse than that.

16 MR. CAMERON: Does anybody want to ask Joe a  
17 question about the Sandia findings on that? Again, they're  
18 not actually formal findings, but we thought that you might  
19 be interested in that. And if you want to talk to Joe  
20 afterwards, please do that.

21 Grant, do you have a question?

22 MR. HUDLOW: Yes, I have a question. DOE has told  
23 us that the casks are going to be at 360 degrees C and they  
24 told us that the interior, with the rods that are encased in  
25 the zirconium, are going to be -- so the cask design, as I

1 understand it, according to the paperwork we have, is five  
2 pounds pressure.

3 I don't know how you get five pounds pressure when  
4 you have 360 degrees C and it's already split open the  
5 zirconium inside.

6 I would like to see even a simulator show me that  
7 that cask that's going to be running into a bridge or a  
8 train or whatever, like they did in the videos, at 360  
9 degrees C, and survive.

10 MR. CAMERON: Okay. Thanks, Grant. Can we get  
11 any feedback from Sandia on that particular comment there?

12 MR. SPRUNG: I guess the first place to start is  
13 the steel of the cask doesn't get soft till 500 C. It's not  
14 become mush until temperatures are considered above that.  
15 So the 360 Centigrade would sound high with the Fahrenheit  
16 factor, the softening of steel is quite low.

17 The rods are -- the spent fuel rods are  
18 pressurized, so that's why they elevated pressure some.  
19 When they -- should one of them, because of the impact  
20 forces, say a small crack, the pressure would leave the  
21 cask, but the cask seal, where the cask is two inches of  
22 seal on the outside, four inches of lead, another inch of  
23 steel, then we have the fuel assembly that Bob Luna showed  
24 you a picture of.

25 The lid of the cask is four inches thick, that's



1 24-36, very large bolts, two O-rings that go all the way  
2 around the lid, one inside of the other. These are like the  
3 O-rings in a washerless faucet

4 It is very difficult to damage that lid and its  
5 seat enough so that the O-rings separate and the cask will  
6 leak. We have done tests where we dropped casks onto very  
7 hard surfaces, harder than the hardest rock you can find  
8 beside the road. The seals don't fail. It takes an  
9 extremely high speed collision, 90 miles an hour, say, to  
10 cause maybe the seal to fail. Then the leak is so small,  
11 it's likely to plug, run into oxide dust, powder that is  
12 compressed.

13 It is very, very difficult to get something out of  
14 the cask, except for in an extremely rare accident,  
15 something with a very tiny chance of occurrence for  
16 shipments, maybe one in a million, probably more like one in  
17 a billion.

18 MR. CAMERON: Thanks, Jerry. Thank you for  
19 clearing the temperature issue up. Ken, you want to add  
20 something?

21 MR. SORENSON: Yes, real briefly. I think we and  
22 the industry and the community have witnessed lots of very  
23 severe tests on these casks and they are very incredibly  
24 robust. But it is very hard for them to verbally  
25 communicate that.

1 There's nothing that communicates that and seeing  
2 an actual sort of event that you'd worry about. There, to  
3 me, is value in that testing.

4 MR. CAMERON: Good. Willy?

5 MR. FRAGOSA: I had a thing about the -- when  
6 you're out there and you're doing your work, this is the  
7 like the second or third fastest computer in the world. Is  
8 that right? So you can do a lot of things, right? It's  
9 like a magic gene or something, right?

10 You know, the -- there's nothing like the real  
11 thing. So I know the advantage and how much less it costs  
12 for computers in the first place and how much just to run  
13 one and then to have all the people that it takes, you know,  
14 to do all that.

15 It's hard for me to imagine. I don't even use a  
16 computer. So you are able to simulate things. Is that  
17 correct? In incredible detail. Because, to me, as a  
18 layman, I hear you, and it sounds pretty good, if I were  
19 going to buy a car or something.

20 But I think we still need physical testing. I  
21 don't think that the cost -- I know that on a scale, as an  
22 A, the paper that I looked at last night. But still, when  
23 we consider cost as opposed to -- as I said last night, I  
24 know Grant said this before, but even one accident where  
25 something happened would be too much.

1 I'm sure you could find out so much more from an  
2 actual test and then put that through your computer and come  
3 up with an even better design. I'm all for tests.

4 And by the way, there's another test tomorrow at  
5 the new test site at 4:00.

6 MR. CAMERON: Okay. Thank you, Willy, for that  
7 information and also for another supportive comment about  
8 the need for actual testing.

9 Does anyone else have anything at this point you  
10 want to ask about what you heard about? Any other questions  
11 or comments? Yes, ma'am. I think I'm going to probably  
12 have to ask you to come up here, because of obvious  
13 limitations.

14 MS. SOLLINGER: I'm Nancy Sollinger. I just have  
15 a question. Talk about the risks associated with  
16 transportation, I hear about severe accidents and the like,  
17 but for all the driving I do, I'm wondering, have you  
18 analyzed the normal stuff, like flat tires and broken down  
19 engines and what are the risks associated with those and  
20 recovery procedures for something that looks like it's  
21 probably very heavy?

22 MR. CAMERON: I think that we all can understand  
23 the essence of that question. Who would -- Susan or Rob?  
24 Rob, do you want to try and handle this for us, please?

25 MR. LEWIS: Yes. I believe we do look at all

1 types of accidents and we looked at probabilities of any  
2 type accident and then in addition to that, we looked at the  
3 different types of accidents that could happen as another  
4 factor.

5 So things like flat tires -- well, let me say, if  
6 a flat tire causes an accident, it would be in the accident  
7 that we used. If the flat tire just caused the person to go  
8 over to the side of the road, change the tire and then keep  
9 on going, it wouldn't be reported to the accident database.

10 Of course, something like that has no probability  
11 of damaging the fuel cask or a gas tanker or anything else.  
12 So the answer is sometimes.

13 As far as emergency response activities and  
14 recovery of the cask, if it falls off the truck, picking it  
15 up with a crane and putting it on another truck, we do look  
16 at those types of activities, but not in terms of this  
17 study, because this study that we're doing is to look at how  
18 the cask performs during an accident and whether or not  
19 there would be any release of radioactive material or  
20 increased radiation as a result of the accident.

21 Of course, if an accident occurred, we would know  
22 how to go about picking it up and putting it back on and  
23 continue the shipment.

24 MR. CAMERON: Before we go to Kylinda, let me ask  
25 Nancy, did that answer your question or do you still?

1 MS. SOLLINGER: Sort of. I just wanted to know  
2 were any studies actually done so that part could get  
3 answered.

4 MR. CAMERON: Okay. Any studies actually done on  
5 the types of circumstances that you raised. Rob?

6 MR. LEWIS: Studies that were done on  
7 transportation events that have -- like, for example -- the  
8 answer is yes. There have been studies, but not the ones  
9 we're talking about tonight.

10 There have been studies done. For example, a  
11 shipment of fresh fuel was going from the place that made  
12 the fuel to a reactor and that shipment got involved in an  
13 accident and fire and that event was essentially studied as  
14 to how the emergency response activities occurred, what  
15 improvements could be made.

16 MR. CAMERON: Okay. Nancy, if you want to find  
17 out more about specific studies and issues like that, please  
18 talk to Rob afterwards, because I'm not sure that we've  
19 really hit on everything for you.

20 MR. LEWIS: I can give you a copy of that report,  
21 if you're interested. That's all public information.

22 MR. CAMERON: Okay. Why don't you use this  
23 microphone?

24 MR. SPRUNG: I'm sure there are standard  
25 procedures for the routine accident. I think she was asking

1 about the common accidents.

2 MR. CAMERON: That's correct, Jerry, your  
3 understanding of Nancy's question. So, Rob, think about  
4 that and if there is more that we can offer later, let's do  
5 that for Nancy.

6 Kylinda?

7 MS. TILGES: Kylinda Tilges, Citizen Alert Las  
8 Vegas. Nancy's question led me to a question I forgot that  
9 I had. As some people know, Citizen Alert has a full scale  
10 mock nuclear waste cask that we truck around the country to  
11 convince and show people what it may possibly look like when  
12 it comes through, if it comes through.

13 We had it a couple of weeks ago coming from Pioche  
14 and Tonapah on -- I forget which highway that is, but it's  
15 two lanes, one this way, one that way. That's down there by  
16 the test site, coming straight across the top of the test  
17 site. But it's two lanes.

18 Now, this is a mock nuclear waste cask. Our  
19 transmission blew. We're stuck on the road, pitch black  
20 night. When we finally get a tow truck driver out there, he  
21 almost didn't stop because of what he saw, until he finally  
22 realized it said "mock" and the radioactive symbols had a  
23 circle and a slash through it, he'd probably take his  
24 chances.

25 Not to mention all the near accidents that almost

1 happened because it was coming off of a rise and no one  
2 could see us coming over that until they were already over  
3 and they're traveling at 70 plus. Seventy is the speed  
4 limit, but if anyone drives around there, you know that's  
5 just the guideline.

6 If that was a real cask, your transmission could  
7 break down just like ours did, who is going to come out and  
8 help them and how would that happen?

9 MR. CAMERON: I think that this is a time to ask  
10 Department of Transportation to address that issue and also  
11 some of the driver training issues. Rick Boyle, I would ask  
12 you to come up and answer not only Kylinda's specific  
13 question, but I think you know what issue she's driving at.

14 If you could just elucidate on that for all of us,  
15 I think it would be helpful.

16 MR. BOYLE: Thank you. A lot of this will come  
17 about as the Department of Energy puts together their  
18 transportation plan, but the features that we're going to  
19 look at for that plan, we're going to look at satellite  
20 tracking, something like that, they'll know where the trucks  
21 are at all times.

22 They'll also -- you can't prepare for every inch  
23 of the route, but you'll set up your points as to where  
24 you're going to pull off and where you can't. If you're  
25 sensing trouble, certainly, you can't plan a flat tire. But

1 I think they will have scheduled tow trucks or all the  
2 equipment they'll need along the way, where your situation  
3 was a little different, where you didn't have the resources  
4 or you weren't required --

5 Nobody came in and said we'll be pulling a mock  
6 cask around, so we'd like to make sure you have tow trucks  
7 all along the way, but we have salvage. My feeling, from  
8 what we've done in similar cases, with the large reactor  
9 components, where they were being shipped, before they  
10 leave, they had to have salvage equipment for every point  
11 along the route, if you run into problems, set up safe  
12 harbors you've coordinated with, you coordinate with the  
13 Coast Guard so that they know where you are and you check  
14 in, I believe they checked in every hour.

15 I hit my weigh point and everything is fine. So I  
16 would -- I can't speak for the Department of Energy, but I  
17 believe that's how they're going to transport it and every  
18 hour there is a check-in. I'm with the Hazardous Material  
19 Group, so I don't know if you would like me to go over the  
20 driver's license that you have to have.

21 If you're going to carry this, you're going to  
22 have a commercial driver's license. You're also going to  
23 have the HAZMAT stamp on it that says you've been trained  
24 not only in the operation of the vehicle, but you know what  
25 you're carrying and the hazard that that produces, you're

1 going to be prepared, as we said, for cordoning off areas.

2 It's certainly not going to be the average truck  
3 driver, you just pull them in and say haul this to that  
4 point and he doesn't know what to do. He's going to know  
5 exactly what the material is and if he runs into problems,  
6 how to shut down the road, if it's something, as you're  
7 saying, that's one lane each way and block the entire lane,  
8 he'll be able to do that.

9 MR. CAMERON: Great. I think that's very helpful  
10 on that. Ken, you want to add something?

11 MR. SORENSON: One real good point, and that's the  
12 -- I was going down to Carlsbad, they are actually tracked  
13 by satellite. They're in constant communication with the  
14 base station. They do have escorts and there's a lot of  
15 control over the shipments.

16 So if there were an unscheduled breakdown, in  
17 terms of cordoning off the area, the people are right there  
18 with the shipment to do that. I'm not saying that's exactly  
19 how it would happen with the shipments, but certainly that  
20 is one point --

21 MR. CAMERON: Good. I think that that's useful  
22 information for the public to have. Of course, there's a  
23 lot of detail behind that that we haven't heard about that I  
24 think might be useful for the public to know about in regard  
25 to these shipments. Grant?

1 MR. HUDLOW: First of all, I'd like to thank  
2 Sharon for letting us --

3 MR. CAMERON: Don't wander too far.

4 MR. HUDLOW: -- to a suburb of New York, some of  
5 the most effective people on the planet, I'm not sure that  
6 we always live up to that, but we try.

7 I also would like to thank her for getting  
8 information. It sounds like she's continuing to get  
9 information. Nine million radioactive shipment per year is  
10 well above anything anybody has ever said before.

11 I'm also honored that the purpose of the meeting  
12 is to ask for help.

13 On this HAZMAT thing, the nuclear shipments would  
14 be okay unless they happen to run into a truck like the one  
15 that caught on fire at Tonapah. It took us half the night  
16 to get a response team out of town to handle that.

17 The call from the truck went back to West  
18 Virginia. Fortunately, we had a guy, Steve Mason, go and  
19 told the local fire fighters how to cut the truck open and  
20 try to handle the fire. We would have had real massive if  
21 he hadn't stopped that.

22 So when it comes to HAZMAT, in this state, it's an  
23 absolute joke. There isn't any. Nellis shut theirs down.  
24 We have a dozen trained people, maybe half a dozen. The  
25 assistant fire chief, when I asked him what he would do if

1 he had that kind of an accident, he said leave town.

2 I think the population feels that that's taken  
3 care of is a huge lie and unacceptable, I think, for it to  
4 come from the government. We have enough problems with the  
5 government anyway without something like that happening.

6 The other things that I wanted to mention, again,  
7 Dr. Luna was talking about soliciting input, seeing that  
8 this material is reasonable and useful, and he mentions that  
9 he has a public concern problem and I think that's why we're  
10 here.

11 The government nationwide has a public concern  
12 problem and as an industrial manager, and I own my own  
13 company now, the way you handle public concern is doing  
14 exactly what you're doing, ask for questions and then try to  
15 resolve those questions. That involves people and their  
16 concerns and then you go away.

17 However, Dr. Luna said something about that  
18 they're allowed 300 millirems for an annual dose. The EPA  
19 only allows the public temperature get 25 millirem per  
20 annual dose. Now, if you're talking about ten millirems at  
21 6.6 feet, if the thing is stopped in traffic and you're a  
22 foot or two away from it, the millirems go up exponentially  
23 and we're talking a few minutes and somebody has an illegal  
24 dose and we're doing that right now.

25 The plutonium, for example, from Russia, under

1 emergency conditions, they brought it to SRS. They're  
2 dumping it out here at the test site in God knows what kind  
3 of conditions.

4 I think the NRC needs to know that that's the kind  
5 of people they're dealing with at the DOE. These are not  
6 public utilities, publicly owned utilities. These are  
7 people that are used to operating in secret and they do  
8 things at the spur of the moment that, if they had to time  
9 to think about it, are absolutely insane.

10 During the Cold War, we had to put up with that.  
11 We had a battle on our hands. Getting that stuff out of  
12 Russia was pretty -- we had to go in in the middle of the  
13 night with helicopters, planes, get it on a ship, get it out  
14 of there, and this continued until they dumped it out at the  
15 test site.

16 So okay, but I want you to realize that's the kind  
17 of people you're dealing with. And they don't have the  
18 technical expertise to handle this situation at all, not  
19 even close. They're not used to handling anything in a  
20 reasonable safe manner.

21 And they have the transportation standards  
22 violating EPA law. That's unacceptable.

23 MR. CAMERON: Grant, let me -- you've raised three  
24 excellent points that I think we need to address for  
25 everybody here. One is I think we need to clarify the

1 situation in terms of the dose, in terms of what Bob  
2 actually said, but, also, I think people need to hear more  
3 about this dose business.

4 For example, the sitting in traffic issue. So  
5 that's one thing that we need to hear about.

6 Secondly, I would like Rob perhaps to talk about  
7 how the issues report, the Sandia issues report deals with  
8 the different types of accidents that might occur. I think  
9 there was some discussion of that.

10 But I guess the third thing is, and I don't know  
11 who best from our team to address it, is what happens in  
12 terms of -- what would happen in terms of emergency response  
13 if there were -- you know, we heard about the integrity of  
14 the cask, we've heard about satellite tracking, special  
15 driver's license. But what happens if there is a potential  
16 for something happening in terms of emergency response.

17 So let's get those three in order and let's go to  
18 Bob Luna for the exposure issue.

19 MR. LUNA: Let's see. I guess perhaps I went over  
20 this a little too quickly. I think what I said was that the  
21 normal background dose per year in this part of the world is  
22 about 300 millirem. So every year of our lives that we live  
23 in a place like this, we receive a radiation dose from  
24 cosmic rays, radiation from radon and a bunch of other  
25 sources, it's about 300 millirems per year.

1 The cask standard, as you pointed out, the limiting  
2 radiation level is ten millirems at two meters from the  
3 outer boundary of the truck, the vertical boundary of the  
4 truck.

5 So you have to -- in order to get background dose  
6 of radiation, you'd have to be very -- you'd have to be at  
7 that distance for a time which is about 30 hours or  
8 something like that.

9 The allowable dose for the people, individuals, is  
10 a number which, for that case, is set to be about 100  
11 millirems. That's the level at which the standards control  
12 dose to individuals who are not radiation workers.

13 So you'd have to be next to this cask at two  
14 meters out for a time of like ten hours to even get close to  
15 this radiation dose for individuals.

16 You are correct in believing that the dose is  
17 higher as you get closer to the cask, but it's not  
18 exponential. In fact, it goes on the distance. In other  
19 words, if I were at, say, two meters from the cask and the  
20 dose was ten, if I went from two meters to one meter, the  
21 dose would go up by only a factor of two. So the dose would  
22 be like 20 millirems.

23 So it's a linear, not exponential response. There  
24 is one other point, that there have been cases -- DOE has  
25 made some estimates about the maximum dose that they might

1 expect in traffic jams, given the fact that trucks and  
2 vehicles move back and forth and jockey for position in the  
3 lines.

4 Some estimates for that dose are as high as 50  
5 millirems. That's still within the radiation standards and  
6 it's unlikely to happen to the same person in the same year.  
7 So I think the dose is controlled. There are limits on it.  
8 People look at them and try to make sure that the operations  
9 don't violate those kind of issues that you raise.

10 MR. CAMERON: Rob, before Bob sits down, I want to  
11 make sure that we get any other questions or comments on  
12 this dose issue first.

13 John or Kylinda, do you guys have -- let's -- do  
14 you want to comment?

15 MR. HADDER: Just real quick. My understanding is  
16 the radiation field goes -- it's squared to distance.

17 MR. LUNA: When you get far from the cask, it goes  
18 as squared. When you are close to the cask, within a few  
19 meters, it's linear.

20 MR. CAMERON: That's interesting. Zorn, did you  
21 want to --

22 MR. ZORN: At 200 millirem per hour at the surface  
23 of the truck, that's the DOT requirement.

24 MR. LUNA: No, that's not right.

25 MR. ZORN: It's 200 millirem per hour at the

1 surface.

2 MR. LUNA: At the surface of the cask. Is that  
3 right?

4 MR. CAMERON: Let me put this on the record.  
5 We're going to put this on the record. There is a question  
6 about the DOT requirement of 200 millirem -- would you state  
7 this for the record?

8 MR. LUNA: Rob just corrected me. I'm not a  
9 regulator. He said that the dose limit for a package,  
10 exclusive use transport.

11 MR. CAMERON: Which is what?

12 MR. LUNA: The dose there, Rick, is?

13 MR. BOYLE: One thousand.

14 MR. LUNA: One thousand millirems per hour at the  
15 surface, but those kinds of shipments are well controlled  
16 from the standpoint of where people can be with respect to  
17 the cask.

18 MR. CAMERON: Let's hear from DOT on this.

19 MR. BOYLE: That's a good point to say. If you're  
20 looking at your absolute maximum, it would be a thousand  
21 from the accessible surface. So if there was some sort of  
22 personnel barrier, like a fence that they put over it, you  
23 measure from that fence, not the actual surface.

24 But as Rob brought out, if you get into that  
25 thousand and you're in exclusive use, there are a lot of



1 other provisions that go along with how it's loaded and how  
2 it's transported which allow you to go higher than the 200.

3 Since no one -- to my knowledge, no one has said  
4 all of these casks will go exclusive use across the -- even,  
5 say, 200 is -- until somebody tells us they're going  
6 exclusive use, we say if you look at the 200 level, which I  
7 think is more conservative to say we want to see those at  
8 200 and if they're not, then let's see all your provisions,  
9 because you're higher than what we would consider. So we're  
10 not looking at a thousand right now, we're looking at 200.

11 MR. CAMERON: Thank you. We're going to go for  
12 Kylinda for a question now. At some point, we should point  
13 out that the standards that Bob and Rick are talking about  
14 now are these standards, the reference to the EPA standards  
15 is the reference to an EPA standard that refers to the  
16 facility, high level waste facility, rather than  
17 transportation, as I understand it.

18 MS. TILGES: I hope this isn't redundant. Maybe  
19 what you said just needs clarifying. As I understand it, is  
20 there going to be one standard cask? Because the loads are  
21 all going to be different as far as the radiation levels,  
22 depending on how old the fuel is, for one, what kind of  
23 burn-up credits you have.

24 So how are you going to control that? Do you  
25 understand what I'm asking?

1 MR. LUNA: Yes. The control is the NRC  
2 requirement is -- the DOT requirement is ten millirem two  
3 meters from the vertical -- the line which defines the edge  
4 of the vehicle. The casks that are on board, any cask has  
5 to meet that requirement, no matter how many fuel elements  
6 are in it, no matter what the burn-up of that material is,  
7 no matter how old it is.

8 Typically, the certificate of compliance that's  
9 issued by Susan and the people who work for her limit the  
10 number of elements, the burn-up, the age of the fuel to make  
11 sure that that limit is met every time all the time.

12 And they have a quality assurance program in place  
13 when the cask is loaded to make sure that nothing is outside  
14 the certificate of compliance gets in the cask before it's  
15 shipped.

16 MR. CAMERON: We're going to turn this over to  
17 Susan for a comment on that and then we're going to go to  
18 the second issue that Grant raised and go to Rob Lewis to  
19 talk about that.

20 MS. SHANKMAN: Just in terms of dose, there is a  
21 regulatory limit. It applies to every single design that we  
22 approve. It doesn't matter what's in the cask. The cask  
23 has to demonstrate that they can meet that for incident-free  
24 or routine transport.

25 So that the dose that anyone can receive from a

1 cask in any situation is already calculated based on the  
2 content, the shielding. And if I can explain it even  
3 better, it's that we will not license a design that doesn't  
4 come within those parameters with a margin of safety.

5 In other words, it isn't that it just meets it.  
6 Most of the designs -- in fact, all of the designs that we  
7 approve have a margin of safety. So that if there is an  
8 error in the calculations, that's already computed in the  
9 error band.

10 So I want to make it clear that at the same time,  
11 before a cask is shipped, they have to use instruments to  
12 make sure that the dose is as it was calculated and which is  
13 usually lower than the regulatory limit. So that it has to  
14 meet the certificate, not only the regulations.

15 It doesn't matter if they have ten different  
16 designs, they would all be regulated to the same standard.

17 MR. CAMERON: Thanks, Susan. If we need to get  
18 more clarification on that, we'll do that. Now we're going  
19 to go to Rob Lewis to talk about the issue study and how  
20 different accident scenarios are considered.

21 Then I need some help from the NRC staff in terms  
22 of who is going to answer the question in terms of emergency  
23 response.

24 MR. LEWIS: I'd just add one more thought. Even  
25 though there is a higher dose limit that applies to the

1 surface, the one you always hear us talk about is the ten  
2 millirem at 6.6 feet, because that one tends to be much more  
3 restrictive than the higher one is.

4 So that's the one we talk about, because that's  
5 the one that really, in practical matters, is the one that  
6 really comes into play a lot.

7 As Susan said, when we review the cask design, we  
8 look at what the maximum contents would be and at that  
9 maximum contents, we won't approve it unless it meets that  
10 limit.

11 So in practice, casks are very rarely shipped with  
12 the maximum content in it, so it would actually be below the  
13 limit when it goes out for shipment.

14 Now, moving on to the other issue, we do think  
15 it's important, and I'm glad you raised that point, because  
16 we do think it's important that we look at the -- both the  
17 probabilities and the types of accidents that could occur.  
18 We take a real good close re-look at that information,  
19 because the data that we have right now comes from the early  
20 '80s and some better data has been collected and -- I mean  
21 newer data, not necessarily better.

22 And we do think it's important, and I'll refer you  
23 to Chapter 5.3 of the issues report, where it's a very high  
24 priority, two things. One is to look at the sequences of  
25 accidents that could occur. For example, is there a

1 collision; is that collision into a hard rock; is there a  
2 fire.

3 We ask a series of questions about the type of  
4 accident and we think it's very important to take a good  
5 close re-look at that.

6 And there is another chapter in there, also in  
7 Section 5.3, another issue, I should say, that we want to  
8 look at some of the severe accidents that have actually  
9 occurred; not spent fuel accidents, but some severe traffic  
10 accidents like -- maybe like the gasoline tanker explosion  
11 in Las Vegas a couple weeks ago.

12 One thing we mentioned in the issues report, we  
13 want to take an analysis of what would have happened had a  
14 spent fuel cask been in that accident and kind of see how  
15 the systems will respond to the actual real world accidents  
16 that have happened, the most severe accidents that have  
17 happened.

18 MR. CAMERON: Thanks, Rob. I think everybody has  
19 a copy of that issues report and it's eventually going to go  
20 into the Sandia study.

21 Susan, who is the best person to talk to emergency  
22 response in terms of spent fuel shipments? I think that's  
23 going to be an important issue for the public to know about.  
24 And whose responsibility is it?

25 MS. SHANKMAN: I want to start off on that and

1 then Rick Boyle can talk a little bit more about the  
2 Department of Transportation. But just to talk a little bit  
3 about the possibility of a repository in Nevada, what would  
4 we do if we were licensing it.

5 Clearly, the licensing process includes NRC  
6 adoption or review of the environmental impact statement  
7 that's prepared by DOE. As many of you already know, there  
8 was a draft environmental impact statement on which NRC made  
9 some comments and we made comments about the way in which  
10 DOE handled the transportation issues.

11 And as I understand it, they are still working on  
12 responses to that. We were very critical on some of the  
13 transportation issues and how DOE had handled them, and  
14 that's all on the record and if anybody wants a copy of  
15 those comments, we can give them to you.

16 The other thing is that if we adopt that  
17 environmental impact statement, then we have to look at it  
18 and do our own independent analysis and there's a whole  
19 process to do that.

20 If there are problems, there would have to be  
21 mitigation strategies; that is, there would have to be a way  
22 of lowering the risk as it's presented, if we felt that that  
23 risk was not acceptable.

24 So it's not -- what we're talking about tonight is  
25 what we know about transport of spent fuel as it's done

1 today, our standards, the Department of Transportation  
2 standards for the transportation of spent fuel.

3 But that's not to say that there isn't some issues  
4 that might be specific to a repository that's licensed and  
5 there might be more information and more strategies on  
6 transportation issues that would have to be looked at.

7 I don't want you to think, as Rick said, that we  
8 think that they would just say, okay, pull up that  
9 transportation cask, load it up and ship it, without the NRC  
10 looking at that. We look at routes now. I think Rob has a  
11 slide that he can show you of routes that we've approved the  
12 physical protection.

13 Also, the states have a role in selection of  
14 routes and so does the Department of Transportation set  
15 standards for the selection of routes.

16 So this is not an ad hoc operation, nor is it done  
17 without review by the regulators ahead of time. There is  
18 also inspection which right now we accept any shipments --  
19 we have inspectors who would ride on the train that went  
20 from Savannah River and we had inspectors to inspect the  
21 trucks before they left for INEL and another shipment --  
22 there have been shipments, not many, but those of them that  
23 have been approved.

24 And we have, I think, a remarkable record over  
25 time where there have not been accidents involving any of

1 these casks where there has been a release to the public.

2 So I think that it's a very significant activity  
3 that would occur and it would not occur without some review  
4 by the regulation authorities. It wouldn't be, as I said,  
5 ad hoc. So I can't tell you what the measures would be and  
6 I can't tell you exactly what would be done, but the  
7 transportation to and from a repository by DOE has to be  
8 looked at and has to be done in NRC certified packaging.

9 Now, DOE does not always have to use NRC certified  
10 packages. They have to meet U.S. Department of  
11 Transportation regulations and they have a  
12 self-certification process that looks at the NRC standards,  
13 but by law, the shipments to WIPP, the waste isolation pilot  
14 project in New Mexico, in Carlsbad, by law, those packages  
15 have to be certified by the NRC and those packages were  
16 demonstrated through physical testing.

17 They are called True Pack. We have one under  
18 review called Half Pack. Those packages all have had  
19 physical testing.

20 So I don't know exactly how we will review these  
21 particular packages and what DOE will propose, but I want to  
22 assure you that the NRC is not going to sit by and watch  
23 this campaign without being heavily involved in both what  
24 designs are used and how they're going to be shipped, as we  
25 have been with WIPP.

1           So that's my answer to the question of who is  
2 going to regulate.

3           Do you want to speak to emergency responders?

4           MR. CAMERON: This is very important. Also, if  
5 Bill Lake wants to say anything at all, since that issue was  
6 raised, Bill, let us know. Rick?

7           MR. BOYLE: I think the issue was if you had the  
8 cask in an accident, I don't know if you -- I don't think  
9 the response changes if you're in an accident just as a  
10 spent fuel cask or if you want to add other vehicles, other  
11 hazardous material, or keep building the scenario.

12           I don't think the response changes. The two sides  
13 of it are what would they do now -- there's a little  
14 over-simplification, but the emergency response guide that  
15 is put out will have that on how to deal with all hazardous  
16 material incidents.

17           So what you would see is there would be a guide  
18 that's two pages long and if it were spent fuel, it would  
19 tell you this is what you should do, you have to capture the  
20 runoff and fight the fire with foam, water, how you should  
21 give people medical treatment.

22           It's going to tell you what to do in a  
23 step-by-step process. I think we have to be realistic in  
24 the case you brought up. Due to equipment or training or  
25 anything else, the person may say I know what this guide

1 tells me to do, but I can't do that, so I run. I don't  
2 think it's really run, but I think a better term would be  
3 they would back off and keep the situation under  
4 surveillance.

5           That leads into the second part, where do you get  
6 the training, where do you get the equipment. DOT -- our  
7 moneys for this program aren't as vast and NRC and DOE  
8 resources, but we do have a grants program which helps local  
9 -- it helps local, state, anybody, to get the train they  
10 need, to get limited amounts of equipment. We have that  
11 grants program and I'm sure Bill could you tell you about  
12 all the DOE programs that are to train emergency responders.

13           And not to jump the gun a little bit, but I'm  
14 quite certain DOE will be providing or helping fund  
15 equipment and training once routes are official established,  
16 if they say you would have a need for more equipment or more  
17 training. I'm certain funds would be available for both  
18 Department of Transportation and Department of Energy to  
19 improve emergency response capabilities along the routes.

20           MR. CAMERON: That's great. I think we have some  
21 further questions for you here, and I have one myself.  
22 Since DOT has played such a vital role in all of this, is it  
23 possible that Department of Transportation might -- and  
24 maybe you do, I don't know, from lack of information --  
25 would do public seminars on these issues in Nye County, for

1 example?

2 It's something to think about. I don't want to  
3 put you on the spot.

4 MR. BOYLE: I'm sure Department of Transportation  
5 will be participating in numerous outreach activities, such  
6 as this. Will the department come out and sponsor their own  
7 on emergency response as a lead item? I think more  
8 realistically, we would be participating as part of DOE or  
9 NRC programs.

10 We're not the tail on this dog, but we're not the  
11 whole dog, so we're trying to participate and, as we see  
12 here, emergency response has come up and it certainly hasn't  
13 been the dog over the last two days we've spent in this  
14 area.

15 MR. CAMERON: All right. And we appreciate the  
16 fact that you're here and with us on this and other issues.

17 MR. ZORN: I would just like to recommend that all  
18 the truck drivers be trained radiologically, so they can  
19 understand the radiation levels.

20 MR. CAMERON: I think that --

21 MR. BOYLE: That is part of our regulation and  
22 part of getting your commercial driver's license with the  
23 HAZMAT stamp is that you have the awareness and familiarity  
24 training with what you're carrying, and that's for all  
25 HAZMAT, which would cover your ammunition, as well as your

1 radioactive materials.

2 MR. CAMERON: And next time we're going to get a  
3 long string and two tin cans, I guess.

4 Susan, you need to clarify something, but I think  
5 let's let Les Bradshaw ask a question.

6 MR. BRADSHAW: Thank you. Appreciate your  
7 comments. The fact is that the Nuclear Waste Policy Act,  
8 Section 180(c), DOE is going to provide an amount of cash to  
9 meet the unfunded mandate so the county can be prepared for  
10 DOE's high level shipment campaign. We've already had long  
11 discussions on what this county needs to be minimally  
12 prepared.

13 And the amount of money that's going to be  
14 provided by our DOE friends is going to be five or ten  
15 percent. This is a huge problem.

16 We're talking about a 450 year campaign at Yucca  
17 Mountain. There has been a good safety record, we have to  
18 admit that, but the Yucca Mountain shipment campaign will  
19 not be performed, by the best estimates that we can see from  
20 talking to everybody, under the special conditions that  
21 resulted in that squeaky clean safety record over the last  
22 30 or 40 years.

23 It's just not going to happen. There are not  
24 going to be escorted shipments. So it's going to be under  
25 different conditions.

1 We applaud NRC's -- what you are doing to  
2 reexamine the current conditions. I truly wish it could  
3 happen, but in the Nuclear Waste Policy Amendments Act --  
4 well, let me just say this. There are Congressional efforts  
5 to mandate the routes, over the very road she was talking  
6 about. If a truck tipped over out there, it would take  
7 hours and hours for everyone to mobilize. It's hours and  
8 hours.

9 We've talked to DOE about this, but this is not a  
10 clear-cut deal. There are no plans to provide the funds to  
11 make this a very efficient operation. It's just not there.  
12 We've been told that DOE thinks they're going to provide it.

13 MR. CAMERON: Thank you very much for those  
14 comments.

15 MR. BOYLE: Chip, if I could just comment on that.  
16 One branch of the Department of Transportation that does  
17 have a lot of money and that Congress is very good at  
18 appropriating money is the Federal Highway to pass along to  
19 build roads and bridges and name those roads and bridges  
20 after themselves.

21 But unfortunately, they're not here tonight, but  
22 it is our Inspector General's office who is looking at DOT's  
23 role in this overall program and certainly it's premature to  
24 say what's in their report, but we had a nice flight from  
25 Washington out here, so I had a chance to talk to them, and

1 that is one of the issues that they're bringing up now, is  
2 what's the impact on the infrastructure of the country with  
3 these shipments from the Department of Transportation.

4 We have to be prepared through Federal Highway to  
5 act on grants, I think that's what Highway calls them,  
6 highway grants to build highways or to improve two-lane  
7 roads to four-lane roads.

8 And I don't believe, at this point, DOE would be  
9 expected to pay for every road improvement to come along.  
10 It would have to be additional moneys from Federal Highway  
11 and their reprioritization through Federal Highway, but that  
12 probably would be another area where DOT will play a larger  
13 role.

14 No doubt, we would have public hearings on where  
15 we should build roads and how that money should be spent.

16 I don't have that information handy, but my phone  
17 number is 202-366-2993, and I have a DOT phone book in the  
18 office, so I can certainly look them up for you.

19 MR. CAMERON: I think that they mentioned -- and  
20 we would hope that -- we will provide a transcript of this  
21 meeting to the Inspector General, but DOT said that they  
22 could see some of the issues of concern that are coming up  
23 here tonight, including the 180(c) issue and emergency  
24 response. So that they can look at that.

25 But I think they also said they do have a WIPP

1 site that you can get to, so there might be a way to do  
2 that. But we'll try to get that information out to people.

3 And Rob, I think, is going to address your issues.

4 MR. LEWIS: I just have a quick point to clarify  
5 about this. This map is not related to the project. This  
6 is a map, and there's a small line at the bottom that you  
7 probably can't read.

8 This is a map of the routes that have been used  
9 for spent fuel shipments from the period of 1979 through  
10 1997. It comes from a NUREG report that we published time  
11 in 1997 and we periodically publish this. This represents  
12 1,300 shipments, roughly.

13 And if you want a copy of that, we'll make sure  
14 you get it. And I should say we're just about to reissue  
15 that report. It should be out early next year or so.

16 MR. CAMERON: Thank you very much. Thanks, Rob.  
17 Let's go to John. Do you have a question?

18 MR. HADDER: I have a question about the study you  
19 just completed, I guess, in March, 6672. John Hadder,  
20 Citizen Alert.

21 I was wondering, what is routine exposure to the  
22 truck driver on hauling truck casks, in the cab? Do you  
23 know what that is?

24 MR. CAMERON: Okay. I think we're going to go to  
25 -- who is going to answer the routine exposure?

1 MR. LUNA: The routine exposure to the driver in  
2 the cab is set, as I recall, by regulations, at less than  
3 two millirems per hour. Typically, the dose is lower than  
4 that. Jerry, can you tell me what the dose was? I think  
5 RADTRAN, that is the code that was used -- sorry -- the code  
6 that was used to do these calculations, estimates the dose  
7 to the driver under the assumption that the dose rate was  
8 two millirems per hour.

9 MR. HADDER: So if you use one millirem per hour  
10 and you multiply that by the number of hours driving, then  
11 we're looking at a total dose to the driver. Is that right?

12 MR. LUNA: Unless the driver -- in a cross-country  
13 shipment, it might be as high as --

14 MR. HADDER: Twenty millirems?

15 MR. LUNA: Perhaps.

16 MR. CAMERON: Can you just break that down?

17 MR. HADDER: Is that right?

18 MR. LUNA: If it was one millirem per hour and  
19 it's a 20-hour shipment, then it's 20 millirems. If it was  
20 two millirems, it would be 40 millirems.

21 The point is that the driver in these cases,  
22 depending on what the expected dose was, might be treated as  
23 a radiation worker and be covered by the requirements of  
24 radiation workers, which limits exposure to five rem per  
25 year.



1 MR. HADDER: And how does this calculation figure  
2 into the study when you determine your total risk?

3 MR. LUNA: The doses to the drivers were estimated  
4 -- all the shipments that were looked at in this report and  
5 are totaled up and one of the numbers that's in one of the  
6 tables in the report.

7 MR. CAMERON: Could we get John and anybody else  
8 who wants that report --

9 MR. HADDER: I can get them the report, that's not  
10 a problem.

11 MR. LUNA: It's in one of the tables in the first  
12 five pages of the report.

13 MR. HADDER: So that gets together to create a  
14 person rem. And are you considering all the potential  
15 transport miles, if there were a repository program, is that  
16 also in the study?

17 MR. LUNA: All the transport miles that are in  
18 this report are for shipments from representative reactors  
19 to other places, and they consider about 40,000 --

20 MR. SPRUNG: I think the question is whether we  
21 looked at it per year or per shipment. WE looked at it per  
22 shipment, because if you knew how many -- estimate the  
23 number of shipments per year, you would get --

24 MR. LUNA: But the fact of the matter is that  
25 information is tabulated both on the first shipment and on

1 the per year basis.

2 MR. SPRUNG: Only when we did that comparison.

3 MR. CAMERON: We're only getting one side of this,  
4 guys. So maybe you just want to clarify it.

5 MR. HADDER: So when you're talking about risk,  
6 you're talking about risk per shipment now in this report.

7 MR. LUNA: No.

8 MR. HADDER: Okay. Let's get it straight for  
9 everybody.

10 MR. LUNA: This report looks at a number of  
11 shipments, both rail shipments and truck shipments, on a  
12 yearly basis and it looks at a large number of routes and  
13 calculates the risk from normal, incident-free and accident  
14 to all the population routes. It's all summed up for all  
15 the shipments that occurred in that year.

16 The information is also tabulated on a per  
17 shipment basis so that it can be compared to other risk  
18 assessments and other publications.

19 MR. HADDER: I guess the question I'm driving at,  
20 it seems to me that if you got -- if you started adding  
21 things up, the risk over the period of possibly 30 years  
22 starts to start looking pretty -- a lot harsher than what's  
23 in the report.

24 How do you deal with that aspect? You see, you  
25 know where I'm going with this? Twenty millirems per year

1 times how many thousands of shipments time show many years.  
2 The driver, I'm talking about the driver, and that person  
3 rems, right?

4 MR. LUNA: What you have to recognize is that it's  
5 not a single person that's getting all of these doses. The  
6 doses are spread over a large population, crew, drivers,  
7 population, et cetera, such that the dose received by any  
8 individual is unlikely to be more than 100 millirem per year  
9 and certainly is unlikely to be 100 millirem over the entire  
10 course of the shipments.

11 MR. HADDER: So in other words, you don't really  
12 add up all the person rems, do we?

13 MR. LUNA: If you'd like to multiply the yearly  
14 person rem by 24 for 30 or whatever you think the duration  
15 of the shipment campaign is, you can do that and get a  
16 number, and it will still be a small number.

17 MR. CAMERON: Okay. Can we --

18 MR. HADDER: The reason I'm asking this question  
19 is because, to me, this is the type of thing that the public  
20 needs to understand. When you're talking about these risks  
21 and you're talking about people that get exposed in their  
22 truck routinely for hours and hours, how does that figure  
23 out? How does that add up to such a small number?

24 And I'm not saying you did the calculation wrong.  
25 I just want to make sure the public understands how this was

1 done.

2 MR. CAMERON: John, what we're going to do right  
3 now is we're going to have Rick Boyle talk to this and also  
4 Jerry wanted to say something on this. Let's hear from Rick  
5 first and then we can decide on this.

6 I think we hear what your concern is and I think  
7 that Rick is going to try and clarify that a little bit more  
8 than Bob already has tried to.

9 MR. BOYLE: I think you bring up a valid  
10 theoretical point, that if you said you had two millirems,  
11 which is the legal limit at the occupied surface, what  
12 they're doing, you go back to the cab as fast as you can and  
13 you do a measure on that inside surface and it could be two  
14 there.

15 We then come back to the inverse square or linear,  
16 if you're close enough, because the driver doesn't sit with  
17 is back right against that. So you're somewhat less.

18 But you bring up a point, well, if it's ten hours  
19 across, whatever it is, he would get that dose. I believe  
20 you're correct in your logic there.

21 What you're missing, though, is he wears badges  
22 and he's under a radiation protection plan, because as a  
23 worker, they have to keep it below a given limit.

24 So there's not this dose to these drivers. There  
25 is going to be a fleet of drivers. They are all under the

1 radiation protection plan.

2 So let me just say, to me, that would be an  
3 acceptable dose. I know everybody has their own opinion on  
4 what acceptable dose is, but it would be a legal dose and,  
5 in my mechanical engineering sense, not a health physics  
6 sense, an acceptable dose.

7 Now, let's take this one step further, because the  
8 same limits that apply for spent fuel apply to the eight  
9 million other shipments of radio pharmaceuticals, and those  
10 are usually in very small -- it would be any one of us  
11 riding in our cars around from the FedEx to the hospital,  
12 and there's very little separation distance, and what  
13 they're doing there is shielding cars.

14 It's very easy, I'm sure you've seen a lay when  
15 you're having an X-ray, they just run it on the back of the  
16 passenger seat.

17 It's very easy to shield the occupied space. So  
18 you get virtually no dose. It doesn't appreciably increase.  
19 I think you have to look at -- DOE would value these drivers  
20 quite a bit and the training, I think they're into keeping  
21 this guys up to speed and driving. They're not going to let  
22 these people get obscenely high doses when it's so easy to  
23 protect and shield them from this.

24 I'm sure Jerry is very prepared to discuss maybe  
25 the policy of how you actually calculate the dose, but I

1 think the whole issue is a little more theoretical than  
2 real.

3 MR. CAMERON: Thank you very much, Rick, for that  
4 explanation. Now we're going to have another piece of this,  
5 Jerry Sprung, from Sandia.

6 MR. SPRUNG: I just want to say two things here.  
7 The government always worries about people. Those are the  
8 workers, for instance, at Sandia Labs, where we have  
9 reactors, we monitor very carefully and when you get to a  
10 maximum dose -- you're out of there for the rest of the  
11 year. If there was an accident and you got five rem, you go  
12 someplace else.

13 Now, when we do the calculation, it assumes there  
14 are people in the cars driving beside the truck, there are  
15 people beside the road, there are people in truck stops. By  
16 the way, the way fuel shipments are actually made, they  
17 drive without stopping. They do not stop at rest stops.  
18 They drive through from the east coast to the west coast and  
19 do not stop, two drivers.

20 This is an attempt to minimize exposure to people  
21 on the road. The driver doesn't sit in one place for a long  
22 period of time.

23 We can calculate the amount of dose in the general  
24 population. The dose we are talking about is a total dose  
25 received by anyone on the route, if they're driving on the

1 road, next to the route, happen to be at the rest stop where  
2 the truck driver stopped to use the restroom.

3 Now, the question always come up here, now,  
4 suppose I live next to the route that allows these shipments  
5 to go by over a long period of time, how much dose will I  
6 accumulate.

7 Well, ten rem at two meters, 50 feet is getting  
8 smaller. What I'm trying to tell you is the chance of you  
9 being right next to that cask as an individual every time  
10 that cask comes by is really very small.

11 I don't know how to tell you it's impossible, but  
12 at least we have to ask are we worried about something which  
13 could really happen or are we just worried about something  
14 that has a theoretical possibility.

15 Somebody, if they made a lifetime career of  
16 driving by a spent fuel cask would accumulate a lot of dose.  
17 That's not going to happen and for the general public, no  
18 one person over time, even three or four decades will get a  
19 dose like that.

20 MR. CAMERON: Thanks, Jerry. I do want to hear  
21 from Bill Lake, from DOE, who hasn't spoken yet. Bill,  
22 could we have you take that?

23 MR. LAKE: Yes. John, you have a very good  
24 question, one that we're aware of at DOE, and the question  
25 of exposure is real.

1 The analyses we have done, the environmental  
2 impact statement, so on and so forth, as others have stated,  
3 did not look at individual, they look at a fictitious  
4 individual, if you will.

5 So what we really have to do is talk about this,  
6 that among what the real scene is going to be, what the  
7 operation involves, we'll take a much closer look at that.

8 But we don't have that kind of specificity at this  
9 point. That's the unknowns in this process.

10 MR. CAMERON: Thank you very much, Bill. Willy?

11 MR. FRAGOSA: On the way over here, we were  
12 talking about different things and we discussed something  
13 that could happen in the future, that the operators of the  
14 nuclear plants may, at some point, want to reuse that spent  
15 fuel again in some way.

16 We transport it all the way here and then we have  
17 to transport it back again, what are we doing there?

18 I want to just say this for the record, again, as  
19 I did last night, that I'm opposed to any of the  
20 transportation or, once again, our position is that no  
21 transportation at all, leave it on-site, work it out so you  
22 can keep it on-site. That's the position, because we just  
23 feel that there's -- we just don't want to see anymore  
24 created.

25 That's one thing that could happen.

1 MR. CAMERON: Thanks, Willy.

2 MR. FRAGOSA: More of a comment than a question.

3 MR. CAMERON: A comment, too. Two positions,  
4 don't ship it, keep it on-site, and don't create anymore.

5 You also were talking about a -- speculating on  
6 the way over about a spill of the waste being transported,  
7 for example, to a licensed repository.

8 We do have someone here from our technical staff  
9 that works on high level waste. Do you want to say anything  
10 about the retrievability option and whether this speculation  
11 we're talking about is a possibility?

12 In other words, the waste is shipped to Yucca  
13 Mountain, and, Willy, I don't know if this was in your  
14 hypothetical, but it's shipped to Yucca Mountain, it's  
15 disposed of at Yucca Mountain, and then retrieved. Is that  
16 -- Tim, do you want to just talk basically about the  
17 retrieval?

18 I don't know if it would be helpful, but maybe it  
19 would be.

20 MR. McCARTEN: Tim McCarten, with Division of  
21 Waste Management. Yucca Mountain currently -- they ship out  
22 here what they plan for the future of shipping. You are  
23 correct in that there is a retrievability aspect to the  
24 repository. That's in the event that some people -- during  
25 the construction of the repository, after some of the waste

1 has been replaced, after the period of performance  
2 confirmation, and suggests that the public health and safety  
3 is not protected with the waste -- and a week to remove the  
4 waste and take it somewhere else.

5 That is a possibility, but it is not planned that  
6 we would do retrieval. It would only be that if Yucca  
7 Mountain does make it through the licensing process.

8 MR. FRAGOSA: I just raise that because I know  
9 that once again, it's who we're dealing with. I'm not  
10 talking about you folks, but it's the people that run these  
11 places. They don't have any regard for human life, it seems  
12 sometimes.

13 They're willing to put us in too much risk for  
14 profit. Just a comment.

15 MR. CAMERON: And those people have to live within  
16 the regulations I think is one of your points.

17 Well, thanks. Thanks.

18 MR. McCARTEN: And one other small point. People  
19 talk about emergency prepared. If Yucca Mountain is  
20 authorized for a repository site and they do submit a  
21 license application, Part 63 of our regulation for disposal  
22 at Yucca Mountain does have an emergency requirement, as in  
23 plan. There are requirements that they must meet for  
24 emergency planning, for the operation of Yucca Mountain.

25 MR. CAMERON: Thanks, Tim. We're getting towards

1 the end of our time, but I want to go to Kylinda and others  
2 who -- give people one last shot at questions here. Nancy,  
3 I don't know if you have anything else to say.

4 But, Kylinda, why don't you tell us what's on your  
5 mind.

6 MS. TILGES: Just three comments. You, and, I'm  
7 sorry, I don't remember your name, had just said that Yucca  
8 Mountain, if it was used, would be permanent deep geologic  
9 disposal.

10 Well, I sat at a table face to face with Ivan  
11 Itkin, the director of the Office of Civilian Radioactive  
12 Waste Management, director of the program, and apparently he  
13 has a different idea.

14 He's working on a flexible design for the  
15 repository in case -- for monitored retrievable storage, is  
16 what he told me and a group of other people, in case there  
17 was a need 20 to 50 years in the future for possible future  
18 use.

19 This is what he told me. So maybe the departments  
20 are confused somewhere.

21 And the comment I had to make was the safety and  
22 radiation monitoring, the crew and drivers of the casks. I  
23 hope it's going to be a better safety and cash-in plan and  
24 monitoring program than the nuclear workers who are eligible  
25 for compensation right now for their safety and protection

1 plans.

2 And my third comment is Department of Energy does  
3 not have a sparkling clean transportation record. Along  
4 with the literature up there, there is a four to five page  
5 report from the DOE's web site on 72 incidents involving  
6 spent nuclear fuel shipments from 1946 to 1996. It's  
7 interesting reading.

8 It's very difficult to find on their web site, but  
9 it is there, and that's the end of my comments.

10 MR. CAMERON: Okay. Thank you very much, Kylinda.  
11 I'll leave it to the DOE personnel here to look in that  
12 regard. Thank you, Kylinda. Grant?

13 MR. HUDLOW: Thank you. I'd be remiss if I didn't  
14 mention one more thing along this retrievability line. The  
15 so-called waste, under technology that's being checked out  
16 against Los Alamos, it was checked out at Livermore in the  
17 '60s, Los Alamos in the '80s, there's several different ways  
18 of doing that.

19 It's a trillion dollars worth of electricity and,  
20 to me, it's a no brainer that you don't take a trillion  
21 dollars and throw it in a hole and it's going to go into our  
22 water within 25 to 50 years.

23 The investment in that is like DOE estimates of  
24 \$287 billion that's readily available in the investment  
25 community. That isn't a problem at all. They make a

1 trillion dollars on it, they'll put 287 billion in capital  
2 equipment.

3 And I think we need -- that needs to be in the  
4 record, that needs to be stated over and over again, because  
5 we've had a lot of nonsense because the experiments -- and  
6 now we've finally broken them out of the classification  
7 system, part of them, part of them are out of it, and it's a  
8 very viable thing.

9 I can't believe they don't realize that. We  
10 politically have to get the stuff away from those nuclear  
11 plants, because those people there are having a fit, the  
12 governors and so forth. But if we put it in a hole, it  
13 doesn't make any sense at all when there's a trillion  
14 dollars sitting there.

15 MR. CAMERON: Thank you, Grant. Another  
16 alternative. Do any of you gentlemen want to say anything  
17 before we break up tonight? I'm not trying to force you to  
18 do so, I just wanted to give you an opportunity. Zorn or  
19 Les, any final comments?

20 Susan and John, do you have anything final to say?  
21 Then I'm going to turn it over to Susan to close this out.

22 MR. HADDER: One of the things I want to say, that  
23 Citizen Alert is very happy to see NRC doing this kind of  
24 process. This is something we haven't seen in the past and  
25 we're very happy to see it and hope it continues.

1 We do wish that the process had been done for the report  
2 that was finished this past year, 6672, and in fact, that  
3 sheet that was passed out to folks are criticisms from the  
4 State of Nevada on this report.

5 So understand that not everyone agrees that it's  
6 all it says it is. So with that, I'm going to call the  
7 state for their comments, and I'm sure Sandia and so forth  
8 will respond to those, as well.

9 I'm very happy to see this process happening. One  
10 thing I would like to point out, in the discussion we had  
11 earlier, using risk as an example of one of the things we  
12 have to improve on in the public process.

13 I don't think the people in this room have a clear  
14 understanding of where that number comes from exactly,  
15 because it seemed like, based on what was said, you start  
16 adding up the numbers and they don't work into some back of  
17 the envelope calculation.

18 I'm not saying because it was done wrong in the  
19 report. I'm just saying there's a lack of clarity there.  
20 And when you report something like risks are less than so  
21 forth, it needs to be clearly explained so people can  
22 understand where it comes from.

23 Maybe we can talk further about how better to do  
24 that. So when you indicate results in your report, I think  
25 you need to be a little more careful with that.

1 I would also point out that the -- with all due  
2 respect to all presenters, there does appear to be some  
3 inherent bias in supporting and trying to lay potential  
4 fears around nuclear materials.

5 Yeah, I think that they're all scary in some way  
6 or another, but I wish that sometimes the presentations were  
7 a little more straightforward.

8 For example, the ten millirem per hour could have  
9 been easily explained by saying let's make it a chest X-ray  
10 instead of comparing it to background radiation levels and  
11 making it sound less than what it is. Use something  
12 concrete and real that people can understand, for instance.  
13 So that's the only comment that I would add.

14 Also, the physical tests that were done in the  
15 past didn't all come out exactly as jolly as we all hoped.  
16 In fact, some of the tests were cut off before the casks  
17 actually failed just past the regulatory limit.

18 So I'm not saying those are great casks or  
19 anything, but the record on the cask testing, there is more  
20 to it than what you see in some of the films and stuff. And  
21 so understand that.

22 And I really applaud the effort to move forward on  
23 full scale testing, but as I've said before, we want to make  
24 sure that it's done and makes sense and connects to things  
25 that everyone can understand.

1 That's basically the only other comments that I  
2 had. Again, we really hope this kind of process continues  
3 in the future and we hope that it is sincere. I hope it is.  
4 It seems like it is. We'll see when things wrap up.

5 Thanks a lot for taking the time out. Appreciate  
6 it.

7 MR. CAMERON: And thank you for being here. I  
8 think that we can say that it is sincere.

9 MR. FRAGOSA: Let me just add one more. I just  
10 wanted to say one more thing along the lines of what John  
11 was talking about.

12 Perhaps when you put the report together, you  
13 could put another supplement to that, something else that's  
14 a little more plainer language, so that people that aren't  
15 technically proficient can understand something that's in  
16 there, because I look at that, I throw it aside and won't  
17 ever do a thing with it. Make it for numbskulls, spell it  
18 out.

19 MR. CAMERON: Books for the complete idiot, right?  
20 I used to lots of times -- okay. I want to point out that  
21 that's one of the objectives that we have with the summary  
22 paper that Bob Luna is working on and I think we got a lot  
23 of good comment on it.

24 So thank you for that.

25 MS. SHANKMAN: I want to thank you all for being



1 candid and being here.

2 The other thing, it is a very serious subject and  
3 I don't want to minimize the seriousness of it, but I didn't  
4 believe the transport of radioactive material that's  
5 licensed by NRC is done safely -- we have a good record.

6 We talked a little bit about the radio  
7 pharmaceutical shipments that meet the same standard that  
8 we're talking about. Those shipments are being every  
9 morning from places like Synbrook, which is a radio  
10 pharmaceutical company that makes individual doses for the  
11 hospitals, and there are millions of shipments made every  
12 day, every morning, they leave the pharmacy at 2:00 a.m. and  
13 they're at the hospital by 7:00 a.m.

14 So I don't want you to think that -- the concept,  
15 the concept of shipping radioactive material is something  
16 that has been done and has been done over and over again.

17 At the same time, I know there are unique  
18 conditions, much larger packages we're talking about.  
19 That's what we're trying to do.

20 So I hope we continue the dialogue.

21 Anyway, thank you all for being here.

22 MR. CAMERON: Thank you.

23 [Whereupon, at 9:30 p.m., the meeting was  
24 concluded.]  
25